CHAPTER 2C. WARNING SIGNS

Section 2C.03 Design of Warning Signs

Standard:

The fluorescent yellow-green background color shall be used for all pedestrian, bicycle, and school warning signs.

A fluorescent yellow background color shall be used for the Highway-Rail Grade Crossing Advance Warning (W10-1) sign.

(Note: The option stated in the MUTCD has been superceded by the addition to the standard.)

Section 2C.04 Size of Warning Signs

Guidance:

The sizes listed in the Minimum column in Table 2C-2 for diamond warning signs should not be used. A minimum size of 36" x 36" (900 mm x 900 mm) should be used for diamond warning signs on expressways and freeways. The sizes listed in the Expressway column should be used for all shapes of warning signs on conventional roads with 2 or more lanes per direction.

Section 2C.05 Placement of Warning Signs

Standard

If the sight distance shown in the following table is not available on the approach to a STOP sign, a Stop Ahead (W3-1) sign shall be placed on the approach.

STOP Sign Sight Distance				
Posted Speed Limit (MPH)	Stopping Sight Distance (wet pavement)	Increase Correction for 9% Downgrade	Stopping Sight Distance with 9% Downgrade Correction (rounded off)	Minimum STOP Sign Sight Distance (rounded off)
20	115 feet (35 m)	15 feet (4.6 m)	130 feet (40 m)	150 feet (45 m)
25	155 feet (50 m)	20 feet (6.1 m)	175 feet (55 m)	200 feet (60 m)
30	200 feet (60 m)	30 feet (9 m)	230 feet (70 m)	250 feet (75 m)
35	250 feet (75 m)	40 feet (12 m)	290 feet (90 m)	300 feet (90 m)
40	305 feet (90 m)	50 feet (15 m)	355 feet (110 m)	400 feet (120 m)
45	360 feet (110 m)	70 feet (21 m)	430 feet (130 m)	450 feet (140 m)
50	425 feet (130 m)	85 feet (26 m)	510 feet (155 m)	550 feet (170 m)
55	495 feet (150 m)	100 feet (30 m)	595 feet (180 m)	600 feet (180 m)
60	570 feet (175 m)	120 feet (35 m)	690 feet (210 m)	700 feet (215 m)
65	645 feet (200 m)	140 feet (43 m)	785 feet (240 m)	800 feet (245 m)

Table NC-2C-1

Support:

Table NC-2C-2 expands upon Table 2C-4 in the MUTCD by providing suggested distances and suggested maximum distances for advance placement of warning signs in North Carolina.

Section 2C.06 Horizontal Alignment Signs – 270-Degree Loop Sign (W1-15)

Guidance:

The 270-Degree Loop (W1-15) sign should be used in conjunction with the Advisory Speed (W13-1) plaque for loops on interchanges where significant numbers of vehicles fail to accomplish the turn safely. This sign is for limited use and should be used only at those locations where special emphasis is needed.

Section 2C.10 Chevron Alignment Sign (W1-8)

Guidance:

If Chevron Alignment (W1-8) signs are used along a curve, at least three Chevron Alignment signs should be used.

Section 2C.11 Truck Rollover Warning Sign (W1-13)

Guidance:

The Truck Rollover Warning (W1-13) sign should be installed at loops on interchanges where there is a significant potential for trucks to overturn while traveling along a ramp or loop. This sign is for limited use and should be used only at those locations where special emphasis is needed as indicated by accident analysis or by the geometrics of the ramp or loop design.

Section 2C.16 NARROW BRIDGE Sign (W5-2)

Guidance:

A NARROW BRIDGE (W5-2) sign should be used in advance of bridges that are 18 to 25 feet (5.5 to 7.6 m) wide where the clear roadway width is less than the width of the approach pavement plus 2 feet (0.6 m).

Section 2C.17 ONE LANE BRIDGE Sign (W5-3)

Guidance:

A ONE LANE BRIDGE (W5-3) sign should be used in advance of bridges whenever the clear roadway width is less than 18 feet (5.5 m).

Guidelines for Advance Placement of Warning Signs

Posted or 85th Percentile Speed MPH (Km/H)	**Condition A:** High Judgement required [2] feet (m)			**Advance Placement Distance** [1]																				
				Condition B: Stop Condition [3]			**Condition C:** Deceleration condition to listed advisory speed - MPH (km/h) (or desired speed at condition [4])																	
				0			10 –15 (15 - 25)			20 - 25 (30 - 40)			30 –35 (50 -55)			40 – 45 (60 - 70)			50 – 55 (80 - 90)			60 - 65 (95 -105)		
20 (30)	225 (70)	250 (75)	350 (105)	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
25 (40)	325 (100)	350 (105)	450 (140)	N/A [5]	-	-	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
30 (50)	450 (140)	475 (145)	575 (175)	N/A [5]	-	-	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35 (60)	550 (170)	575 (175)	675 (205)	N/A [5]	175 (50)	-	N/A [5]	-	-	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-	-	-	-
40 (65)	650 (200)	675 (205)	775 (235)	125 (40)	300 (90)	450 (140)	N/A [5]	-	-	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-	-	-	-
45 (75)	750 (230)	775 (235)	875 (270)	175 (50)	350 (105)	500 (150)	125 (40)	300 (90)	450 (140)	N/A [5]	-	-	N/A [5]	-	-	N/A [5]	-	-	-	-	-	-	-	-
50 (80)	850 (260)	875 (270)	975 (300)	250 (75)	400 (120)	550 (170)	200 (60)	350 (105)	500 (150)	150 (45)	300 (90)	450 (140)	100 (30)	300 (90)	450 (140)	N/A [5]	-	-	-	-	-	-	-	-
55 (90)	950 (290)	975 (300)	1075 (330)	325 (100)	450 (140)	600 (180)	275 (85)	400 (120)	550 (170)	225 (70)	350 (105)	500 (150)	175 (50)	350 (105)	500 (150)	100 (30)	300 (90)	450 (140)	N/A [5]	-	-	-	-	-
60 (100)	1100 (335)	1125 (345)	1225 (375)	400 (120)	500 (150)	650 (200)	350 (105)	450 (140)	600 (180)	300 (90)	400 (120)	550 (170)	250 (75)	400 (120)	550 (170)	175 (50)	350 (105)	500 (150)	N/A [5]	-	-	-	-	-
65 (105)	1200 (365)	1225 (375)	1325 (405)	475 (145)	550 (170)	700 (210)	425 (130)	550 (170)	700 (210)	400 (120)	500 (150)	650 (200)	350 (105)	450 (140)	600 (180)	275 (85)	400 (120)	550 (170)	175 (50)	300 (90)	450 (140)	N/A [5]	-	-
70 (115)	1250 (380)	1275 (390)	1375 (420)	550 (170)	650 (200)	800 (245)	525 (160)	650 (200)	800 (245)	500 (150)	600 (180)	750 (230)	425 (130)	550 (170)	700 (210)	350 (105)	450 (140)	600 (180)	250 (75)	350 (105)	500 (150)	150 (45)	300 (90)	450 (140)
	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum	MUTCD Distance	Suggested Location	Suggested Maximum

Notes:

1. The distances are adjusted for a sign legibility distance of 175 ft (50 m) for Condition A & B. The distances for Condition C have been adjusted for a sign legibility distance of 250 ft (75 m), which is appropriate for an alignment warning symbol sign.

2. Typical conditions are locations where the road user must use extra time to adjust speed and change lanes in heavy traffic because of a complex driving situation. Typical signs are Merge and Right Lane Ends. The distances are determined by providing the driver a PIEV time of 14.0 to 14.5 seconds for vehicle maneuvers (2001 AASHTO Policy, Exhibit 3-3, Decision Sight Distance, Avoidance Maneuver E) minus the legibility distance 175 ft (50 m) for the appropriate sign.

3. Typical condition is the warming of a potential stop situation (Condition B). Typical signs are Stop Ahead, Yield Ahead, Signal Ahead, and Intersection warning signs. The distances are based on the 2001 AASHTO Policy, Stopping Sight Distance, Exhibit 3-1, providing a PIEV time of 2.5 seconds, a deceleration rate of 11.2 ft/second^2 , minus the sign legibility distance of 175 ft (50 m).

4. Typical conditions are locations where the road user must decrease speed to maneuver through the warned condition. Typical signs are Turn, Curve, Reverse Turn, or Reverse Curve. The distance is determined by providing a 2.5 seconds PIEV time, a vehicle deceleration rate of 10 ft/seconds^2 , minus the sign legibility distance of 250 ft (75 m).

5. No suggested distances are provided for these speeds, as the placement location is dependent on sight conditions and other signing to provide an adequate advance warning for the driver.

   Adjustments may be made fore grades if appropriate.

NOTE: The above table is provided as an aid for determining warning sign location. The distances contained in the above table are for guidance purposes and should be applied with engineering judgment. This guide for advance warning sign placement does not change Table 2C-4 in the M.U.T.C.D., but only provides additional information for warning sign locations based on field conditions the sign erector encounters on a regular basis. As always, if the sign erector has any concerns about the location of the warning sign, he/she should place the warning sign in the best possible location and notify the supervisor.

Section 2C.19 END FREEWAY and END FREEWAY 1/2 MI Signs (W6-4, W6-5)

Guidance:

The END FREEWAY (W6-4) and END FREEWAY 1/2 MI (W6-5) signs should be used in advance of a point on a freeway where there is a change to a lower class of highway, or where a congested condition exists requiring a definite reduction in speed. The W6-4 sign should be placed at least 750 feet (230 m) in advance of the end of the freeway, with 1,250 feet (380 m) to 1,500 feet (450 m) being desirable.

W6-4

W6-5

Section 2C.21 ROAD ENDS XX FT Sign (W18-11)

Standard:

The ROAD ENDS XX FT (W18-11) sign shall be installed at the stated distance from the end of the road.

Support:

Section 3C.04 contains information regarding end-of-roadway markers.

W18-11

Section 2C.22 Low Clearance Signs (W12-2 and W12-2p)

Standard:

When a Low Clearance (W12-2) sign is used in advance of the structure, a distance ahead (W16-2a) plaque shall be installed below the sign.

W12-2

W16-2a

Section 2C.33 Lane Ends Signs (W4-2, W9-1, W9-2)

Guidance:

The W9-2 sign should not be used.

Support:

The first Option paragraph in Section 2C.33 in the MUTCD does not apply (see North Carolina Roadway Standard Drawing No. 909.20(S), Sheets 1 and 2).

Section 2C.35.A PASSING ZONE AHEAD Sign (W14-3a)

Guidance:

The PASSING ZONE AHEAD (W14-3a) sign should be used only along sections of 2-lane highways where special pavement markings have been installed to provide definite passing zones for a particular direction of travel. The sign should normally be erected 500 feet (150 m) in advance of the passing zone.

The W14-3a sign should not be placed just before left-turn lanes, as this might lead to confusion and the use of the left-turn lane for passing.

W14-3a

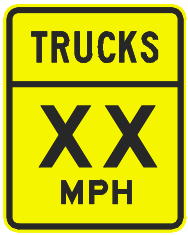
Section 2C.36.A Advisory Truck Speed Sign (W13-4)

Guidance:

The Advisory Truck Speed (W13-4) sign should be posted on the right shoulder of the road at the gore of the exit lane leading to permanent official truck weigh stations. The speed limit to be shown on the sign should be determined by existing conditions.

Option:

The W13-4 sign may also be posted within the truck weigh station area on the immediate approach to the weighing scales.



W13-4

Section 2C.40 Vehicular Traffic Signs (W8-6, W11-1,W11-5, W11-5a,W11-8, W11-10, W11-11, W11-12p, W11-14)

Standard:

The Emergency Vehicle (W11-8) sign shall not be erected in advance of an emergency vehicle station unless it is approved by the Traffic Engineering and Safety Systems Branch.

Support:

The use of these signs will be considered only when all of the following conditions are met:

a. Traffic volumes on the road in front of the fire station averages at least 1,000 vehicles a day.
b. A substantial amount of the traffic is comprised of drivers who are unfamiliar with the route.
c. The stopping sight distance is less than 600 feet (180 m) along one or both of the approaches to the driveway(s).
d. The speed limit is 35 mph (60 km/h) or greater.

(Note: Per Paragraph 6 of the *MUTCD*, the W11-8 sign shall be used in advance of all emergency-vehicle traffic control signals. Approval from the Traffic Engineering and Safety Systems Branch is not required in this case.)

Option:

The Farm Vehicle (W11-5 or W11-5a) sign may be erected, when approved by the Traffic Engineer, at locations frequently used by farmers to cross state maintained roads with tractors and/or farming equipment. Although this sign is not intended to be used to warn of tractors/equipment being driven along the roadway and/or shoulders of the roadway, if the points of entering and exiting the roadway are in close proximity to each other, this may be considered a crossing area.

Guidance:

Consideration should be given to the type of farm equipment the tractor might be pulling across the roadway in determining adequate sight distance.

Option:

Upon approval by the Division Traffic Engineer, the Golf Cart (W11-11) sign may be installed at locations where golfers cross a state highway while golfing.

Section 2C.41 Nonvehicular Signs (W11-2, W11-3, W11-4, W11-6, W11-7, W11-9)

Standard:

The use of Nonvehicular warning signs shall be based on an engineering study, engineering judgment, or a high accident rate at the proposed crossing.

The fluorescent yellow-green background color shall be used for all pedestrian, bicycle, and school warning signs and any supplemental plaques on these signs. Other warning signs that are not related to pedestrians, bicyclists, or schools along a corridor or within a zone shall not use the fluorescent yellow-green background color.

(Note: Paragraphs 6 and 7 of Section 2C.41 have been superceded by the new standard paragraph shown above)

Option:

The Deer Crossing (W11-3) sign may be installed when speeds are above 45 mph (70 km/h) and the investigations by the Division Traffic Engineer determine a site to be a frequent deer crossing and/or a high accident location involving deer.

Support:

Deer Crossing signs normally will not be installed in subdivisions or on unpaved roads because of slow speeds and local traffic.

Standard:

Upon approval by the Division Traffic Engineer, the Department shall install Cattle Crossing (W11-4) signs at points agreed upon by the cattle owner and the Department. These locations shall be selected to give reasonable warning of places where five or more cows customarily or frequently cross state roads. No one owner shall be entitled to request the placing of signs at more than one point on a single tract or on abutting tracts.

Option:

Upon approval by the Division Traffic Engineer, the Equestrian Crossing (W11-7) sign may be installed at locations where equestrians frequently use bridle paths crossing state roads.

Support:

The W11-7 sign is not intended to be used to warn of horses being ridden along the shoulder of the roadway and normally would not be installed in subdivisions or on unpaved roads because of slow speeds and local traffic.

Section 2C.46 Advisory Speed Plaque (W13-1)

Guidance:

When determining an advisory speed with a ball-bank indicator, the 10-degree ball-bank indicator reading should be used.

Section 2C.51 SHARE THE ROAD Plaque (W16-1)

Guidance:

In situations where there is a need to warn drivers to watch for bicyclists traveling along the highway, a SHARE THE ROAD (W16-1) plaque should be used.

Standard:

When a Share the Road plaque is mounted below a Bicycle Warning (W11-1) sign, the background color shall be fluorescent yellow-green.

Section 2C.55.A BROKEN PAVEMENT (W8-13), LOOSE SAND (W8-7a), and HIGH WATER (W14-5) Signs

Guidance:

These signs are intended for temporary use and should be removed promptly when the hazard no longer exists.

W8-13

W8-7a

W14-5

Section 2C.55.B SLIDE AREA (W8-14) and FALLING ROCK (W8-12) Signs

Guidance:

The W8-14 and W8-12 signs should be placed in advance of the hazardous area.

W8-14

W8-12

Section 2C.55.C ROAD SUBJECT TO FLOODING Sign (W14-6)

Guidance:

The ROAD SUBJECT TO FLOODING (W14-6) sign should be used when a roadway is subject to being closed because of intermittent flooding.

W14-6

Section 2C.55.D TUNNEL (W14-8) and DRAW BRIDGE (W14-9) Signs

Standard:

The TUNNEL (W14-8) and DRAW BRIDGE (W14-9) signs shall be installed in advance of tunnels and draw spans.

W14-8

W14-9

Section 2C.55.E TRUCKS ENTERING HIGHWAY Sign (W14-12)

Option:

The TRUCKS ENTERING HIGHWAY (W14-12) sign may be installed in advance of driveways and roads (such as from quarries, construction sites, and industrialized areas) where a traffic engineering study shows that large volumes of entering truck traffic pose hazards to the mainline traffic.

Standard:

The sign shall be removed promptly when no longer needed.

W14-12

Section 2C.55.F LOW FLYING PLANES Sign (W14-13)

Option:

The LOW FLYING PLANES (W14-13) sign may be used in the vicinity of airports where low flying planes might startle drivers or where the planes present an actual collision hazard, such as where an airport runway ends close to where the flight path crosses the roadway.

W14-13